**Commonwealth of Kentucky**
**Division for Air Quality**

# *PERMIT STATEMENT OF BASIS*

Title V / Title I – PSD
Permit: V-15-009 R4
Westlake Vinyls, Inc. – PVC Plant
Calvert City, Kentucky 42029
June 16, 2020
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SOURCE ID: 21-157-00040
AGENCY INTEREST: 2967
ACTIVITY: APE20190005; APE20190006; APE20190009

**SOURCE DESCRIPTION**

The Westlake Vinyls, Inc. – PVC Plant is a synthetic organic chemical manufacturing industry (SOCMI) source falling under SIC Group 28. Polyvinyl chloride is produced at this facility by polymerization of vinyl chloride monomer in batch reactors. Following polymerization, the polyvinyl chloride slurry is sent to steam stripping columns to separate the polyvinyl chloride from unreacted vinyl chloride monomer which is recycled back into the process. The gas stream from the recovery system is vented to the process vent incinerator. Following the stripping process, the resin is sent to the slurry bend tanks and dryer feed tanks. Next, the polyvinyl chloride resin is dried, screened and sent to PVC storage silos. Polyvinyl chloride is produced at this facility and the finished product is shipped by truck and rail transport.

**Permit V-15-009 R4 included the following Activities:**

**Activity APE20190009 (Title V Minor Revision)**

This change involves taking a limitation on the annual average firing rate on emission unit 21 (Rotary dryer #3). The firing rate will be reduced from 15 mmBtu/hr to 14 mmBtu/hr.

**Activity APE20190007 (502(b)(10) change)**

This change involves replacing the bags in the silo baghouse for silo #21. The manufacturer's guarantee for these bags are 0.005 grains per dscf for particulates 0.5 micrometers and larger.

**Activity APE20190006 (Title V Minor Revision)**

This project includes the construction of a 220,000 pound capacity silo (#14) to store dry off-spec PVC and a railcar loading spout to load the off-spec PVC into rail cars.

**Activity APE20190005 (Significant Revision)**

On May 8, 2019, the Division received an application for a significant revision to the Westlake Vinyls, Inc. – PVC Plant which includes construction authority for two emission units and BACT determination for PM/$PM_{10}$/$PM_{2.5}$, CO, VOC, and Greenhouse gases. An addendum to the application was submitted on January 31, 2020. The changes in Westlake Vinyls, Inc. - PVC Plant include new equipment (addition of a new cooling tower and increase in the number of equipment leak components) and modifications to existing equipment in the PVC Plant as well as implementation of many physical and operational changes to improve efficiency and yield to incrementally increase production rates. The application also requests increase in the capacity rating of existing dryers. The facility is increasing the dryer rating for the Carrier Dryer (EP 33) to 75,000 lb/hr and the Andritz

Dryers (EPs 78 and 79) to 95,000 lb/hr. Westlake Vinyls, Inc. – PVC Plant is planning to implement several energy efficiency projects as well as process optimizations in order to increase the dryers' capacities; however, the PTE from these dryers will not change.

The new equipment is summarized on Table 1, and the upstream and downstream impacts are summarized on Table 2. The changes will increase the annual PVC production to 2.0 billion pounds PVC per year from 1.7 billion pounds per year as of Permit V-15-009 R3 issued 1/20/2018.

**Table 1: New Equipment Summary**

| Emission Unit | Equipment | Description of New Equipment |
|---|---|---|
| 31 | Cooling tower #2 | 1.5 million gallons per hour cooling tower with high efficiency demisters |
| 020 | Equipment leak fugitives | Additional VOC components will be added |

**Table 2: Upstream and Downstream Impacts**

| Emission Unit | Equipment | Description of Impacts |
|---|---|---|
| 03 | Silo loading | Increased utilization, no PTE change |
| 60 | Railcar loading | Increased utilization, no PTE change |
| 10 | Wastewater | Increased utilization, no PTE change |
| 12 | Stripper downstream vinyl chloride monomer | Increased utilization, no PTE change |
| 15 | Boiler #1 | Increased utilization, no $NO_X$ emission factor change (stack test) |
| 21 | Rotary dryer #3 | Increased utilization, no PTE change |
| 22 | Boiler #2 | Increased utilization, no $NO_X$ emission factor change (stack test) |
| 30 | Cooling tower #1 | Increased utilization, no PTE change |
| 33 | Carrier fluidized bed dryer | Increased utilization, 20,000 pound increase in capacity, no PTE change |
| 78 | Andritz dryer #1 | |
| 79 | Andritz dryer #2 | |
| 055 | Polyvic storage tank | Insignificant activity with increased utilization, no PTE change |

**Table 3: Equipment to be Decommissioned**

| EPN | Equipment | Description of Equipment |
|---|---|---|
| None at the PVC plant | | |

**Activity APE20190004 (502(b)(10) change)**
This production change will authorize a peroxide procedural change in the PVC Plant during the summer of 2019. This change has the potential to increase productivity, improve quality, and decrease raw material cost.

**Activity APE20190002 (502(b)(10) change)**
The proposed change will reverse the cooling water flow in the reactor # 7 condenser to determine if it improves the condenser's cooling efficiency in the summer months. If the project is successful, the same modification will be extended to the other nine reactors.

**Activity APE20190001 (502(b)(10) change)**
This project will result in the addition of a cooling tower cell to the existing PVC cooling tower, however, the circulation rate off the cooling tower will be unchanged. The additional cell will improve cooling efficiency in the summer months. In addition, the drift eliminator efficiency will be increased from 0.007 to 0.001 percent.

**Activity APE20180001 (502(b)(10) change)**
This activity included the following three projects:
1. The PVC plant has one raw material charge header to deliver material to the ten (10) PVC reactors. An additional material charge header will be added to provide redundancy and operations flexibility. This will require the installation of valves, pumps, a compressor, and flanges.
2. Additional cooling water piping to the condenser for each reactor in the PVC plant will be added to improve condenser heat transfer in the summer. The change will involve the installation of two (2) manual ball valves and less than 20 feet of piping for each reactor.
3. A steam line from the outlet of the boiler directly to the Andritz 2 dryer will be installed to divert steam from the main header and eliminate high-pressure situations. Only emissions resulting from this project will be steam and water.

**BACT ANALYSIS FOR 2020 EXPANSION PROJECT APE20190005 (Significant Revision)**

**Federal New Source Review Applicability Review**
The Westlake Vinyls, Inc. – PVC Plant, Source ID 21-157-00040 is located in Marshall County, at 230 Johnson Riley Road, Calvert City, Kentucky. Although Westlake Chemical OpCo, LP; Westlake Vinyls, Inc. – Vinyls Plant; and Westlake Vinyls, Inc. – PVC Plant have been issued and operate under individual Title V permits, the plants are considered a single stationary source for the purposes of major NSR and Title V permit procedures since the facilities are (1) located on one or more contiguous or adjacent properties, (2) are under common control (all being subsidiaries of Westlake Chemical Corporation), and (3) belong to a single major industrial grouping (i.e., SIC Major Group Code 28). Each permittee is responsible and liable for their own violations, unless there is a joint cause for the violations.

The calculated emission increase for the proposed changes associated with the project and the Federal NSR PSD applicability determination for a major modification are shown in Tables 4 through Table 6, and the final determination is summarized in Table 7.

**Project Emission Increase Calculations**
Pursuant to 401 KAR 51:001, Section 1 Definitions (144)(a), a net emissions increase for any regulated NSR pollutant emitted by a major stationary source means the amount by which the sum of an increase in emissions from a particular physical change or change in method of operation at a stationary source as calculated pursuant to 401 KAR 51:017, Section 1(4), or 401 KAR 51:052, Section 1(2); and any other increases and decreases in actual emissions at the major stationary source that are contemporaneous with the particular change and are otherwise creditable exceeds zero. Generally, baseline actual emissions are subtracted from the projected actual emissions.

Pursuant to 401 KAR 51:001, Section 1 Definitions (20)(b), "Baseline actual emissions" means the rate of emissions, in tons per year, of a regulated NSR pollutant, that the unit actually emitted during any consecutive twenty-four (24) month period selected by the owner or operator within the ten (10) year period beginning on or after November 15, 1990, and immediately preceding the earlier of the date the owner or operator begins actual construction of the project or the date a complete permit

application is received by the cabinet for a permit required under 401 KAR 51:017 or 51:052. The Baseline Actual emissions used to calculate the net emissions increase of this project are from January 2016 to December 2017 for all NSR pollutants.

Projected actual emissions (PAE) are calculated by multiplying the baseline emissions by the percent production increase. If the percent increase exceeds the potential to emit (PTE) for the emission unit, then the PTE value is used for the PAE (new units are set to PTE).

**Table 4: Project Emission Increases (tpy)***

| | CO | $NO_X$ | $SO_2$ | PM | $PM_{10}$ | $PM_{2.5}$ | VOC | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Westlake Chemical OpCo, LP | 266.92 | 57.08 | 0.93 | 15.76 | 15.68 | 12.95 | 31.68 | 388,476 |
| Westlake Vinyls, Inc. – Vinyls Plant | 87.11 | 80.77 | 1.33 | 15.40 | 15.35 | 15.34 | 24.28 | 276,712 |
| Westlake Vinyls, Inc. – PVC Plant | 19.11 | 6.01 | 0.14 | 11.21 | 2.14 | 1.79 | 15.14 | 13,487 |
| | | | | | | | | |
| Totals | 373.14 | 143.86 | 2.4 | 42.37 | 33.17 | 30.08 | 71.1 | 678,675 |

*Emission increase values are calculated by taking the difference between the PAE and BAE emissions on an individual emission unit basis at each facility.

**Netting Analysis for $NO_X$**

Westlake has opted to calculate increases and decreases in actual emissions for $NO_X$, in order to show that the net emissions increase for NOx from the proposed project is not considered a significant increase to trigger further analysis under PSD. All projects at Westlake Chemical OpCo, LP within the contemporaneous period were only increases in utilization, and thus there are no creditable $NO_X$ emissions increases or decreases at this facility. The contemporaneous increases for the Westlake Vinyls, Inc. – Vinyls Plant are shown below in Table 5. Creditable contemporaneous period increases for the Westlake Vinyls, Inc. – PVC Plant are only due to the installation of an emergency generator in November 2015; and are reflected in the $NO_X$ netting analysis summary shown in Table 6.

**Table 5: $NO_X$ Netting Analysis Westlake Vinyls, Inc. – Vinyls Plant**

| EU | EP | Physical or Operational Change Due to Project | Emission Increase* (tpy) |
|---|---|---|---|
| 082A | 082A | September 2015, #3 Fire Water Pump Engine was installed | 0.40 |
| 005 | 009 | May 2016, Boiler #2 was installed | 30.12 |
| 004 | 012 | May 2016, Boiler #5 was removed | -3.24 |
| 081A | 081A | November 2016, #2 Fire Water Pump Engine was installed | 0.34 |
| 084 | 084 | September 2016, Emergency Firewater Generator installed | 1.38 |
| 085 | 085 | March 2017, Emergency Generator was installed | 1.38 |
| CAP | 437 | October 2017, hours of operation increased from 320 to 876 hr/yr | 0.15 |
| 088 | 088 | May 2018, Portable Diesel Engine was installed | 0.52 |
| CAP | 437 | January 2019, Hours of operation increased from 876 hr/yr to 8760 hr/yr | 3.52 |
| 001 | 008 | 2020 Expansion Project, Boiler #1 is being decommissioned | -56.08 |
| 002 | 010 | 2020 Expansion Project, Boiler #3 is being decommissioned | -26.91 |
| 003 | 011 | 2020 Expansion Project, Boiler #4 is being decommissioned | -183.37 |

*Westlake has opted to use January 2012 through December 2013 as the basis for the baseline actual emissions for the netting analysis.

**Table 6: $NO_X$ Netting Analysis Summary**

| Facility | Contemporaneous Emission (tpy) |
|---|---|
| Westlake Vinyls, Inc. – Vinyls Plant | -231.78 |
| Westlake Chemical OpCo, LP | 0 |
| Westlake Vinyls, Inc. – PVC Plant | 0.19 |
| | |
| Total from project emissions increase | 143.86 |
| Total Contemporaneous Increases/Decreases | -231.59 |
| Total net emissions increase | -87.73 |

**Table 7: PSD Applicability Evaluation Summary***

| Pollutant | Project Increases (tpy) | SER Level (tpy) | Is Netting Required? (Yes/No) | PSD Netting Conducted? (Yes/No) | Is PSD Review Required? (Yes/No) |
|---|---|---|---|---|---|
| $NO_X$ | 143.86 | 40 | Yes | Yes | No |
| CO | 373.14 | 100 | Yes | No | Yes |
| VOC | 71.1 | 40 | Yes | No | Yes |
| $SO_2$ | 2.4 | 40 | No | No | No |
| PM | 42.37 | 25 | Yes | No | Yes |
| $PM_{10}$ | 33.17 | 15 | Yes | No | Yes |
| $PM_{2.5}$ | 30.08 | 10 | Yes | No | Yes |
| GHG | 678,675 | 75,000 | Yes | No | Yes |

* Summary is for all three facilities combined (OpCo, Vinyls and PVC) due to single source determination

**BACT Applicability**

Each of the new or modified emission units included as part of Westlake's 2020 Expansion Project that generate PM/$PM_{10}$/$PM_{2.5}$, CO, VOC or GHG emissions subject to PSD review require BACT review, because the project increases are greater than the significant emission rate (SER) thresholds. Existing emission units at which a net emission increase occurs as a result of a physical change or a change in the method of operation in the unit (per 401 KAR 51:017 Section 8(3)(b)) require a BACT analysis. Details of the BACT analysis are presented below.

**Emission Unit 031 Cooling Tower #2**

Westlake Vinyls, Inc. – PVC Plant submitted a BACT analysis for the cooling Tower (PM/$PM_{10}$/$PM_{2.5}$ and VOC), where proposed control technologies were identified and discussed. The following section discuss the control options listed in the RBLC as BACT for cooling towers.

**BACT Analysis for PM/$PM_{10}$/$PM_{2.5}$ at EU 031 Cooling Tower #2**

The facility conducted a review of the RACT/BACT/LAER (RBLC) Clearinghouse considering all cooling towers, regardless of size, to provide an indication of prior BACT determinations for cooling tower sources. The primary PM/$PM_{10}$/$PM_{2.5}$ emissions control method for cooling towers is to reduce the release of drift aerosols. Solids, which result in PM/$PM_{10}$/$PM_{2.5}$ emissions, are dissolved in the aerosols. The cooling tower forced ambient air flow carries aerosol droplets or "drift" from the top of the tower. PM/$PM_{10}$/$PM_{2.5}$ emissions are generated when the liquid is evaporated.

**Identify All Control Technologies**

*High-efficiency drift eliminators*

This control device can substantially reduce the release of aerosol droplets from cooling towers. The drift eliminator sections consist of several varieties of structured media that cause changes in the direction of the air flow passing through the eliminator which promote removal of droplets by coagulation and impaction on the eliminator surfaces. Aerosol generation is reduced with these eliminators to as low as 0.00005 percent of circulating water flow, compared to about 0.02 percent (AP-42 Table 13.4-1) for "uncontrolled" cooling towers.

*Indirect contact tower exchanger*

This method uses a sealed bank of exchanger tubes, bathed in a circulating water cascade, to cool process water.

*Dry cooling towers*

This method is increasingly used to reject the heat of condensation from utility steam turbines, which can operate at much higher condensing temperatures (i.e. higher turbine discharge pressure) than the return cooling water temperature required for processes.

*Limiting solid concentrations in the circulating water*

In general, water droplets released as drift from wet cooling towers contain dissolved solid concentrations equivalent to the solids concentrations in the circulating water. Therefore, limiting the total dissolved solids the cooling water can directly reduce particulate emissions. Dissolved solids can accumulate in the cooling water due to the following:

- An increase due to evaporation of the cooling water.
- Adding anti-corrosion additives to the cooling water.
- Adding anti-biocide additives to the cooling water.

*Proper equipment design, operation, and maintenance*

These methods can help ensure that the drift eliminators work properly to maximize PM/$PM_{10}$/$PM_{2.5}$ reduction. In addition to proper maintenance practices, particulate entrainment rates are influenced by air velocities in the system. Proper operation and maintenance practices include routine inspections of the following:

- Drift eliminators and fills;
- Water basin for clarity, surface debris, and temperature.
- Bleed-off valves, strainers, drains, and float valves for proper operation.
- Internal surface conditions for rust, scale, sludge, and biofilm accumulation.
- Water distribution pipework, including nozzles.

**Eliminate Technically Infeasible Options**

*Indirect contact tower exchanger*

The circulating water-side of the exchanger that is cooled by forced draft resembles a conventional wetted-media cooling tower; therefore, drift aerosols as well as PM/$PM_{10}$/$PM_{2.5}$ emissions will be generated. Therefore, indirect-contact heat exchangers are not feasible for reduction of PM/$PM_{10}$/$PM_{2.5}$ emissions.

*Dry cooling tower*

A dry cooling tower is only technically feasible for use during the cooler months because the ambient dry bulb temperature must be below the required cooling water supply temperature. Dry cooling could

not be used for 4 to 6 months of the year as its use is limited to when ambient temperature is below 75 degrees Fahrenheit. Therefore, this option is rejected as technically infeasible.

**Selection of BACT**
Westlake Vinyls, Inc. – PVC Plant will use the follow methods as BACT:
1. State-of-the-art, high-efficiency drift eliminators with a drift rate specified at 0.0005% percent of the circulating water rate;
2. Monitoring and limiting total dissolved solids in the circulating water; and
3. Proper equipment operation, and maintenance

These controls have been identified in other BACT determinations in RBLC database. There are no significant costs or environmental factors associated with these options.

**BACT Analysis for VOC at EU 031 Cooling Tower #2**
VOC emissions can occur from cooling towers, where the circulating water is used to cool down hydrocarbon process streams. VOCs that could potentially enter the cooling water would ultimately be stripped out by the cooling tower's air flow into the atmosphere.

**Identify All Control Technologies**
*Use of non-contact cooling water system*
Designing process equipment (e.g., heat exchangers) to prevent contact of the cooling water with process streams helps ensure VOCs do not enter the cooling water stream.

*Cooling water monitoring program*
VOC emissions from cooling towers can be controlled by monitoring the cooling water for hydrocarbons (using turbidity monitoring or examining for an oily sheen) and minimizing hydrocarbon leaks into the cooling water system.

**Eliminate Technically Infeasible Options**
Both options are technically feasible.

**Selection of BACT**
Westlake Vinyls, Inc. – PVC Plant will use the follow methods as BACT:
1. Using non-contact cooling water system; and
2. Monthly monitoring of vinyl chloride monomer (VCM) or VOC concentration in the cooling water.

**Table 8: Emission unit 031 Cooling Tower Summary**

| Pollutant | RBLC BACT | BACT Determination | BACT Limit |
|---|---|---|---|
| PM<br>$PM_{10}$<br>$PM_{2.5}$ | 1. Drift eliminators with a drift ranging from 0.001 to 0.0005%<br>2. Monitor and control TDS in the circulation water within a range of 1000 to 3000 ppm | 1. High efficiency drift eliminators with manufacturer guarantee<br>2. Monitor and control total dissolved solids concentration | 1. Maximum drift loss 0.0005 % of the total cooling water flow rate<br>2. TDS of the cooling water will be maintained equal to or less than 2000 parts per million on an annual average basis |
| VOC | 1. Limit the amount of VOC in water treatment chemicals | 1. Limit the amount of VOC in water treatment chemicals | VOC concentration in water shall not exceed 3.9 parts per million by volume or VCM |

| Pollutant | RBLC BACT | BACT Determination | BACT Limit |
|---|---|---|---|
| | 2. LDAR program<br>3. Monthly monitoring of VOC. | 2. Monthly monitoring of VOC or VCM | concentration in water shall not exceed 50 parts per billion by weight, on a 12-month rolling basis, measured pursuant to 40 CFR 63.11920 |

**Emission Units 33, 78, and 79 PVC Dryers**

Westlake Vinyls, Inc. – PVC Plant existing PVC Dryers have integrated cyclones on the exhaust air, which are not considered an add-on control device, followed by a venturi scrubber with mist eliminators to control PM emissions from the dryers. Westlake submitted a BACT analysis for the emission units 33, 78 and 79 for PM/$PM_{10}$/$PM_{2.5}$ emissions.

**BACT Analysis for PM/$PM_{10}$/$PM_{2.5}$ at Emission Units 33, 78, and 79**

Westlake conducted the RBLC review considering PVC Dryers, regardless of size, to provide an indication of prior BACT determinations for PVC dryers at other facilities.

**Identify All Control Technologies**

*Wet Scrubber*

The venturi scrubbers intercept dust particles using droplets of water. The larger particle-enclosing water droplets are separated from the remaining droplets by gravity. The solid particulates are then separated from the water. The PM removal efficiencies of Venturi scrubbers range from 70% to greater than 99%, depending on the application.

*Electrostatic Precipitator*

These control devices remove particles from an air stream by electrically charging the particles then passing them through a force field that causes them to migrate to an oppositely charged collector plate. An electrostatic precipitator can generally achieve approximately 99-99.9% reduction efficiency for PM emissions.

*Baghouse (fabric filter)*

A baghouse consists of several fabric filters, typically configured in long, vertically suspended socklike configurations. Particulate laden gas enters from one side, often from the outside of the bag, passing through the filter media and forming a particulate cake. Under the proper operating conditions, a baghouse can generally achieve approximately 99-99.9% reduction efficiency for PM emissions.

**Eliminate Technically Infeasible Options**

*Baghouse (fabric filter)*

The exhaust stream from the dryers is saturated with water from the PVC drying operations; therefore, a baghouse/fabric filter, which cannot be operated in moist environments where the condensation of moisture causes operational problems, is technically infeasible.

**Selection of BACT**

The existing venturi scrubber's manufacturer guarantee is between 0.00524 – 0.00634 grains per dry standard cubic feet grains per (dscf) and have been stack tested to actually achieve between 0.0084 – 0.00159 grains per dscf. The RBLC database search reports that BACT is between 0.0053 – 0.02 grains per dscf for PVC dryers, and all PVC dryers in the database are equipped with cyclones/scrubbers. The facility's existing control equipment is the same equipment type as listed in the RBLC and the operating performance meets or exceeds the BACT.

**Table 9: Emission Units 33, 78, and 79 PVC Dryers PM Emissions Summary**

| Pollutant | BACT Determination | BACT Limit |
|---|---|---|
| PM | Multicyclone/ cyclone and scrubber. | PM, $PM_{10}$ and $PM_{2.5}$ emissions shall not exceed 0.004 grains/dscf |
| $PM_{10}$ | | |
| $PM_{2.5}$ | | |

**Emission Unit 20 Fugitive Equipment Leaks**
Westlake Vinyls, Inc. – PVC Plant conducted the RBLC review considering equipment leak fugitives. The equipment leak fugitives involve process piping components (pumps, valves, connectors, etc.) to distribute the liquid and gaseous materials among process units during the manufacture of products. VOC emissions from those components are mostly related to leakage from seals, connection interfaces, valve stems, etc.

**BACT Analysis for VOC at EU 20 Fugitive Equipment Leaks**
The primary control strategy is an effective LDAR program. The requirements for such programs are defined in the federal and state regulations. All such programs require identification of equipment in VOC service, periodic monitoring of equipment depending upon its component type and a suitable definition of a "leaking" component, deadlines for efforts to repair and completion of repair, requirements to re-monitor repaired components to verify repair, and appropriate recordkeeping and reporting to the agency.

**Identify All Control Technologies**
*Use of leakless or Low-leak technology for some components*
Leak-less technology valves are designed to be used in situations where highly toxic compounds are present. Leak-less equipment is not available for all components that may have fugitive emissions, so another program is also required for LDAR for such components.

*Use of a LDAR Program with instrument sensors together with established federal or state requirements for identification of fugitive components, specified monitoring schedules, repair deadlines and recordkeeping and reporting requirements.*
Use of instrument LDAR programs, alternative remote sensing LDAR programs and LDAR programs consisting of audio/visual/olfactory monitoring are considered to be technically feasible.

*Use of an alternative monitoring program using remote sensing technology such as infrared cameras along with repair deadlines and appropriate recordkeeping and reporting.*
Use of instrument LDAR programs, alternative remote sensing LDAR programs and LDAR programs consisting of audio/visual/olfactory monitoring are considered to be technically feasible. However, using a remote sensing or infrared camera system, does not quantify the size or concentration of a leak which are needed to trigger further monitoring and repair requirements.

*An LDAR program using routine inspection plus audio/visual/olfactory means (as distinguished from instrument detection) to detect leaks and promptly repair them, coupled with appropriate recordkeeping and reporting.*
Use of instrument LDAR programs, alternative remote sensing LDAR programs and LDAR programs consisting of audio/visual/olfactory monitoring are considered to be technically feasible. However, AVO observation-based LDAR programs are not as effective as instrument-based or remote sensing programs for non-odorous chemicals.

*Use of Lower Leak Definitions with LDAR Monitoring*
Instrument-based LDAR, following the federal NSPS and MACT regulations and lower leak definition of 500 ppm for light liquid pumps is an effective means to reduce VOC leaks.

*Directed Maintenance with LDAR Monitoring Program*
Directed maintenance with LDAR monitoring programs is primarily used to provide additional control for a specific compound that require additional emission reductions in order to pass health impacts. Specifically, directed maintenance is used to address off property impact problems associated with piping fugitive emissions from specific compounds and fugitive emissions subject to nonattainment new source review permitting actions. An air toxics analysis has been performed showing no problems with any off property air impacts and the facility is not a nonattainment area, therefore directed maintenance is not applicable.

*Good Work Practices*
Good work practices include:
1. Construction of new and reworked piping, valves, pump systems, and compressor systems shall conform to applicable American National Standards Institute (ANSI), American Petroleum Institute (API), American Society of Mechanical Engineers (ASME), or equivalent codes based on the material.
2. New and reworked buried connectors shall be welded.
3. To the extent that good engineering practice will permit, new and reworked valves and piping connections shall be reasonably accessible for leak checking during plant operation.
4. Damaged, leaking, or severely rusted valves, connectors, compressor seals, agitator seals, and pump seals found by visual inspection to be leaking (e.g., process fluids) shall be tagged and replaced or repaired. All leaking components that cannot be repaired until a scheduled shutdown shall be identified for such repair by tagging.
5. Open-ended lines are required to be equipped with a cap, plug, blind flange, or second valve.
6. New relief valves are required to vent to a control device for any potential releases and as a result, any fugitive emissions are reduced. Exceptions may be made if venting relief valves to control will result in a safety concern, but this does not exempt the company from controls such as equipping the valve with a rupture disk and pressure-sensing device.

**Eliminate Technically Infeasible Options**
*Use of Leak-less Technology for Some Components*
Leak-less technology valves are designed to be used in situations where highly toxic compounds are present. Leak-less equipment is not available for all components that may have fugitive emissions, so another program is also required for LDAR for such components. Further, leak-less valves cannot be repaired without a unit shutdown. Components in the PVC Plant are not considered to be highly toxic; thus, these fluids do not warrant the additional risks associated with a unit shutdown for repair. For this reason, leak-less valve technology is considered to be technically infeasible.

**Selection of BACT**
Westlake Vinyls, Inc. – PVC Plant proposes to use the most stringent VOC based instrument monitoring system applicable to the components, as BACT for each component unit. Based on a review of the RBLC, implementation of an LDAR program and use of low leaking technology are the BACT determinations for control of VOCs from equipment leak fugitives. Westlake is installing new components in the PVC Plant and the proposed implemented controls are listed below. The described controls are consistent with the RBLC's most-stringent requirements; therefore, no further analysis is required.

1. The permittee will follow the LDAR program as required by 40 CFR Part 63, Subpart UU.
2. Leak is defined as a reading of 500 ppmv.
3. The permittee will install leakless pumps with dual mechanical seals or with a barrier fluid to reduce leaks, as possible. If a leakless pump is not feasible, the permittee shall submit justification as to its technical infeasibility.
4. The permittee will monitor new non-leakless pumps to a leak detection threshold of 500 ppm.
5. The permittee will use good work practices listed above.

**Table 10: Emission Units 020, Fugitive Equipment Leaks Summary**

| Pollutant | RBLC BACT | BACT Determination |
|---|---|---|
| VOC | 1.LDAR Program as required by NSPS, NESHAP, or MACT Standards.<br>2.Use low leaking technology. | 1. LDAR program with instrument sensors together with 40 CFR 63, Subpart UU requirements<br>2. Leak is defined as a reading of 500 ppmv<br>3. Install leakless pumps with dual mechanical seals or with a barrier fluid to reduce leaks, as possible<br>4. Monitor new non-leakless pumps to a leak detection threshold of 500 ppm.<br>5. Good work practices |

**PSD Modeling Analysis:**

**Screening Methodology**

The incremental increases in ambient pollutant concentrations associated with the Westlake Chemical Corporation (Westlake) project will be estimated through the use of the American Meteorological Society / Environmental Protection Agency Regulatory Model (AERMOD) Version 19191 applied in conformance to applicable guidelines. A protocol was prepared following Appendix W, as published in Federal Register on January 17, 2017.

The Division's net emission increase calculations differ slightly from those performed by Westlake; however, the represented emission increases in the modeling demonstration performed by Westlake are conservative. The Division believes the modeling has sufficiently represented that there will be no impacts on NAAQS for the area.

Model simulations for short-term and annual-averaged CO, $PM_{10}$, and $PM_{2.5}$ emissions are performed with AERMOD using the 5-year meteorological database. For each pollutant, the maximum value over 5 years for each applicable time averaging period is compared to the appropriate SIL.

**Table 11: SIL Results for PSD NAAQS**

| Pollutant | Averaging Period | Model Conc. | SIL | Secondary $PM_{2.5}$ Conc. | Total Conc. | Percent of Threshold | Additional Review Required? |
|---|---|---|---|---|---|---|---|
| | | ($\mu g/m^3$) | ($\mu g/m^3$) | ($\mu g/m^3$) | ($\mu g/m^3$) | (%) | |
| $PM_{10}$ | 24-hour | 1.7565 | 5 | N/A | 1.7565 | 35.13 | No |
| | Annual | 0.2834 | 1 | N/A | 0.2834 | 28.34 | No |
| $PM_{2.5}$ | 24-hour | 1.1569 | 1.2 | 0.0045 | 1.1614 | 96.78 | No |
| | Annual | 0.2748 | 0.3* | 0.0007 | 0.2755 | 91.83 | No |
| CO | 1-hour | 372.50 | 2000 | N/A | 372.50 | 18.63 | No |
| | 8-hour | 73.79 | 500 | N/A | 73.79 | 14.76 | No |

Note: Section 2.1.1 of the PSD Air Quality Analysis Report received by the Division in March 2020 and Updated in May 2020 provides the justification to use a $PM_{2.5}$ annual SIL of 0.3 $\mu g/m^3$

As a part of significant impact analyses, the ambient impacts from the proposed project must also be compared against the associated SMCs in Pre-construction Monitoring Analyses Results Table (Table 12) below to determine if preconstruction monitoring is required for pollutants whose impacts are above their respective SMCs. The following table compares the predicted off-property concentrations to the associated SMCs. As shown below, CO 8-hour and $PM_{10}$ 24-hour-concentrations are below the SMC thresholds; therefore, preconstruction monitoring is not expected to be required.

**Table 12: Pre-construction Monitoring Analyses Results**

| Pollutant | Averaging Period | SMC Model Concentration ($\mu g/m^3$) | SMC Threshold ($\mu g/m^3$) | Percent of Threshold (%) | Additional Review Required? |
|---|---|---|---|---|---|
| $PM_{10}$ | 24-hour | 1.7565 | 10 | 17.57 | No |
| CO | 8-hour | 73.7947 | 575 | 12.83 | No |

**Class I Area Analysis**

Class I area impacts are addressed if the proposed project has an impact that exceeds the screening threshold as described by Federal Land Managers' (FLM) Air Quality Related Values Work Group (FLAG) guidance. In this guidance the sum of the proposed project emissions (in tons per year) of $SO_2$, $NO_x$, $PM_{10}$ and $H_2SO_4$ is divided by the distance to the Class I area and compared to the value of 10. This ratio is known as Q/D. If Q/D is 10 or less, the project is considered to have a negligible impact on the Class I area. If the Q/D value is greater than 10, then further analysis to evaluate impacts in the Class I area is warranted.

There is only one Federal Class I area within 300 km of the Westlake: Mingo National Wildlife Refuge in Missouri at 150 km. The sum of emissions ($SO_2$, $NO_x$, $PM_{10}$ and $H_2SO_4$) for the proposed project is 41.36 tons/year. The calculated Q/D for the proposed project relative to Mingo National Wildlife Refuge is 0.276; as such no additional evaluation of Class I area impacts are required.

**Table 13: Class I Area Q/D Screening Analysis**

| Pollutant | Project Emissions (tons/year) | Q/D Analysis |
|---|---|---|
| $NO_2$ | 0.0* | |
| $SO_2$ | 6.76† | |
| $PM_{10}$ | 34.60 | |
| $H_2SO_4$ | 0.0 | |
| Total | 41.36 | |
| Mingo National Wildlife Refuge | 150 km | 0.276 |

* The $NO_X$ project net emissions increase is negative (i.e., a decrease) so zero (0) is conservatively used for $NO_X$ in the sum for Q instead of the negative number.

† The $SO_2$ emission rate listed is the site-wide PTE after the project instead of just the project increase.

In addition, receptors are placed at 48, 49 and 50 kms due west of the facility to show concentrations that could be expected towards the Mingo National Wildlife Refuge. The table below shows the maximum concentrations at the 48, 49 and 50 km receptors.

**Table 14: Receptors Towards Mingo National Wildlife Refuge**

| Pollutant | Averaging Period | 48 km Model Concentration | 49 km Model Concentration | 50 km Model Concentration | Total Conc. Percentage |
|---|---|---|---|---|---|
| | | ($\mu g/m^3$) | ($\mu g/m^3$) | ($\mu g/m^3$) | (%) |
| $PM_{10}$ | 24-hour | 0.0618 | 0.0586 | 0.0689 | 1.38 |
| | Annual | 0.0031 | 0.0031 | 0.0031 | 0.31 |
| $PM_{2.5}$ | 24-hour | 0.0447 | 0.0435 | 0.0434 | 3.73 |
| | Annual | 0.0037 | 0.0036 | 0.0036 | 1.23 |
| CO | 1-hour | 16.7894 | 16.5081 | 16.3133 | 0.84 |
| | 8-Hour | 8.1254 | 7.9914 | 7.8551 | 1.63 |

A cursory review of the elevations for distances of 48 km, 49 km and 50 km was performed and the elevations from 48 km to 50 km in most cases are decreasing. It was concluded that the elevations are not definitive enough to be the cause of the increase in concentrations at those receptors. The total concentration percentage of the SIL at 50 km for each pollutant and averaging period is also provided in the above table. The concentrations are still well below the SIL as the impacts are less than 1.5% of the SIL for all pollutants at 50 km.

## Modeled Emission Rates for Precursors

Pursuant to the DAQ guidance document "Application of the EPA's Modeled Emission Rates for Precursors (MERPs) for Secondary Pollutant Formation in Kentucky" dated August 2, 2018, (DAQ MERPs guidance) MERPs have been utilized as a Tier 1 demonstration tool for ozone and $PM_{2.5}$ since emission rates affecting those constituents are proposed to be above the applicable significant emission rates. The required ozone and $PM_{2.5}$ demonstrations are satisfied with the worst-case default MERP values listed in Table 3 of the DAQ MERPs guidance.

**Table 15: Default MERP Values for Kentucky PSD Applications**

| Precursor | 8-Hour Ozone (tpy) | Daily $PM_{2.5}$ (tpy) | Annual $PM_{2.5}$ (tpy) |
|---|---|---|---|
| NOx | 169 | 2,449 | 8,333 |
| $SO_2$ | - | 1,500 | 10,000 |
| VOC | 3,333 | - | - |

For the evaluation of the project with respect to ozone, the sum of the project's proposed NOx net emissions increase in tons per year (tpy) divided by the NOx MERP (tpy) for ozone and the project's proposed VOC emissions increase (tpy) divided by the VOC MERP (tpy) is compared to the 8-hour ozone SIL of 1 ppb. If the sum, as shown in the equation below, is less than one, the project is deemed to not have a significant impact on ambient 8-hour ozone levels, and there is no need to conduct a cumulative analysis for ozone.

$$\frac{NOx\ Emission\ Rate}{NOx\ MERP} + \frac{VOC\ Emission\ Rate}{VOC\ MERP} < 1$$

**Table 16: Ozone MERPs Demonstration**

| Averaging Period | $NO_X$ Project Emissions (tpy) | $NO_X$ MERP (tpy) | VOC Project Emissions (tpy) | VOC MERP (tpy) | Total | Is Total < 1? |
|---|---|---|---|---|---|---|
| 8-hour Ozone | 0 | 169 | 75.53 | 3,333 | 0.023 | YES |

Since the sum from the above equation is less than one, the project is deemed to not have a significant impact on ambient 8-hour ozone levels.

The applicable equation is shown below, and the max $PM_{2.5}$ Modeled Concentration is the highest value (annual or H1H 24-hour concentration averaged over five years) of direct $PM_{2.5}$ emission increases modeled using AERMOD. If the sums of the equation for both the 24-hour and annual $PM_{2.5}$ averaging periods are less than 1, the project will be deemed to not have a significant impact on ambient $PM_{2.5}$ concentrations, and there is no need to conduct a cumulative analysis for $PM_{2.5}$.

$$\frac{Max\ PM2.5\ Modeled\ Conc.}{PM2.5\ SIL} + \frac{SO2\ Emission\ Rate}{SO2\ MERP} + \frac{NOx\ Emission\ Rate}{NOx\ MERP} < 1$$

**Table 17: Ozone MERPs Demonstration**

| Averaging Period | Max $PM_{2.5}$ Modeled Conc. ($\mu g/m^3$) | $PM_{2.5}$ SIL ($\mu g/m^3$) | $NO_X$ Project Emissions (tpy) | $NO_X$ MERP (tpy) | $SO_2$ Project Emissions (tpy) | $SO_2$ MERP (tpy) | Total | Is Total < 1? |
|---|---|---|---|---|---|---|---|---|
| 24-Hour $PM_{2.5}$ | 1.1569 | 1.2 | 0 | 2,449 | 6.76 | 1,500 | 0.9686 | YES |
| Annual $PM_{2.5}$ | 0.2748 | 0.3 | 0 | 8,333 | 6.76 | 10,000 | 0.9167 | YES |

The result of the $PM_{2.5}$ daily MERPs analysis is 0.969, and the result of the $PM_{2.5}$ annual MERPs analysis is 0.917. Since the sums from the above equations are less than one for both daily and annual $PM_{2.5}$ analyses, the project is deemed to not have a significant impact on ambient $PM_{2.5}$ levels.

**Table 18: Maximum $PM_{2.5}$ Modeled Concentrations and Applicable SILs**

| Averaging Period | Max Modeled Concentration ($\mu g/m^3$) | Secondary $PM_{2.5}$ Conc. ($\mu g/m^3$) | Total $PM_{2.5}$ Conc. ($\mu g/m^3$) | SIL ($\mu g/m^3$) |
|---|---|---|---|---|
| Daily (24-hour) | 1.1569 | 0.0045 | 1.1614 | 1.2 |
| Annual | 0.2748 | 0.0007 | 0.2755 | 0.3* |

Note: Section 2.1.1 of the PSD Air Quality Analysis Report received by the Division in March 2020 and Updated in May 2020 provides the justification to use a $PM_{2.5}$ annual SIL of 0.3 $\mu g/m^3$

## Alternate Operating Scenarios:

As part of 2020 Expansion project, the Westlake has requested simultaneous operation of the ethylene flare (EPN 321 and EPN 321A) at the Westlake Chemical OpCo, LP facility and Boiler #1, Boiler #4 and, Boiler #6 (EPN 008, EPN 011, and EPN 013) at the Westlake Vinyls, Inc.–Vinyls Plant. There is no alternate operating scenario at the Westlake Vinyls, Inc.–PVC Plant.

Until the removal of the existing flare EU# 007 (EPN 321) at the OpCo facility, the existing flare shall not be operated beyond 180 days after startup of EU# 007A (EPN 321A). Upon startup of EU# 007A (EPN 321A), the combined operating rate of EU# 007 (EPN 321) and EU# 007A (EPN 321A) shall not exceed 56.1 mmBtu/hr on a 30-day rolling average. Westlake shall keep records of the daily average individual and combined operating rates (in mmBtu/hr) and calculate a 30-day rolling average. Westlake shall send notification of the anticipated date of initial start-up of the new flare EU# 007A (EPN 321A) postmarked no more than sixty (60) days nor less than thirty (30) days prior to such date.

Simultaneous operation of EPN 011 (Boiler #4), EPN 008 (Boiler #1), and EPN 013 (Boiler #6) at the Westlake Vinyls, Inc.–Vinyls Plant shall be allowed such that the combined firing rate of the 3 boilers shall not exceed 201.58 mmBtu/hr on a 24-hour average basis. In addition, within 24 months after the final issuance of permit V-19-016, or within 180 days after startup of EPN 013, whichever is sooner, EPN 011 and EPN 008 shall be permanently shut down. This is to ensure that the decrease in NOx emissions is included in the contemporaneous period, to preclude applicability of Sections 8 through 15 of 401 KAR 51:017.

**Other changes:**

1. As part of the significant revision (V-15-009 R4), Westlake Vinyls, Inc.– PVC Plant has chosen to impose maximum hourly and annual heat ratings for the following units:

**Table 19: Imposed Heat rating limitations on a 24-hr and Annual basis**

| Emission unit | Max 24-hr average (mmBtu/hr) | Max annual average (mmBtu/hr) |
|---|---|---|
| 15 (Boiler #1) | 98.5 | 98.5 |
| 22 (Boiler #2) | 98.5 | 98.5 |
| 021 (Rotary dryer #3 with integral cyclone) | 14.0 | 14.0 |
| 033 (Carrier Fluidized bed dryer with integral cyclone) | 16.0 | 16.0 |

For each emission unit listed in the above table, the permittee shall maintain records of the hourly consumption of natural gas and calculate the actual hourly firing rate in accordance with the following equation:

$$NG_{Firing\ Rate}\ (MMBtu/hr) = NG_{use}\ (scf/hr) * 1{,}020\ Btu/scf / 1{,}000{,}000\ Btu/MMBtu$$

For compliance with the Annual Average Firing Rate for each emission unit listed above, the permittee shall calculate and maintain records of the monthly and 12-month rolling average firing rate. The actual monthly firing rate shall be based on the monthly consumption of natural gas using the following equation:

$$NG_{Firing\ Rate}\ (MMBtu/\underline{month}) = NG_{use}\ (scf/\underline{month}) * 1{,}020\ Btu/scf / 1{,}000{,}000\ Btu/MMBtu$$

2. As part of this significant revision, the facility has provided updated DEP 7007 V form for Emissions Units 15 and 22 (Boiler #1 and Boiler #2) to comply with annual tune-up requirements.

3. The Vent Incinerator Emission Unit 09 no longer accepts process stream from Wacker Chemical Corporation. The Division has verified that the lines are indeed inoperable; and has made the necessary changes in the permit V-14-009 R4.

**Minor Permit Revision - Permit V-15-009 R3**

Permit V-15-009 R3 included the following Activities:

**Activity APE20170004**
The following administrative permit amendments will be made to the permit:

1. On Page 6 of the Summary Form, page 13 of the Statement of Basis, and page 74 of Section B of the permit (v-15-009 R2), it was stated that the annual maximum PVC production would be 750,000 tons. This will be corrected in all three documents to an annual maximum capacity is 850,000 tons per year (1.7 billion pounds per year).

2. On Page 26 of Section B of the permit, in the description section of emission unit 10, it was stated that "The water stream following the stripping column is sent to the contiguous Air Products and Chemicals, Inc. (APCI) plant (AFS No. 21-157-00009) wastewater treatment system." Effective January 3, 2017, the facility was sold and is now operating as Evonik Corporation. As a result of the change in ownership "Air Products and Chemicals, Inc. (APCI)" was replaced with "Evonik Corporation." However, the facility will retain the same Agency Interest ID 2916 and AFS No. 21-157-00009.

**Activity APE20170003**
A 502(b)(10) Change was received December 6, 2017, to replace reactors No. 2 and No. 3, which have reached the end of their useful life, with reactors having the same footprint and operational characteristics as the existing ones. It is currently planned to replace reactor No. 3 in February 2018, and reactor No. 2 in the 4$^{th}$ quarter of 2018 or the 1$^{st}$ quarter of 2019. The Polyvinyl chloride (PVC) capacity of the source is currently 1.7 billion pounds per year and the permittee has stated that after the reactor replacements they will continue to adhere to the production limit.

**Minor Permit Revision – Permit V-15-009 R2**
Permit V-15-009 R2 included the following Activities:

**Activity APE20170002**
A Title V Administrative Amendment application was received by email September 15, 2017, to change the corporation name from Westlake PVC Corporation to Westlake Vinyls, Inc. The Administrative Amendment application also changed the name of the source from Westlake PVC Corporation to Westlake Vinyls, Inc. – PVC Plant.

**Activity APE20170001**
A minor revision permit application dated February 8, 2017, was received by the Division on February 13, 2017, to revise the annual polyvinyl chloride (PVC) production capacity of the source from 1,550 million pounds (775,000 tons) to 1,700 million pounds (850,000 tons).

**Activity APE20160003**
A minor revision permit application, dated November 30, 2016, was received by the Division on December 5, 2016, to increase the annual PVC production capacity of the source from 1,500 million pounds (750,000 tons) to 1,550 million pounds (775,000 tons). The following modifications and equipment replacements were completed as a result of this permit action:

1. Emission unit 15 (boiler #1) and emission unit 22 (boiler #2)
   (i) Replace the combustion air fans on each boiler.
   (ii) Improve the flue gas recovery duct.
   (iii) Increase the size of the fresh air intake duct.
   (iv) Improve the current air measurement device in the fresh air intake.
2. Emission unit 33 (Carrier dryer) will have its plenum replaced.

3. Reactors #1 and #4 will be replaced with reactors with the same footprint and operational characteristics as the existing reactors. However, improvements in heat transfer will allow the PVC production to increase to 1,550 million pounds per year.

**NOTE:** Permit V-15-009 R1 (Activity APE20160002) authorized the installation of a 7.5 foot slurry/stripper column. The stripping capacity resulting from the additional stripper was required to achieve the capacity increases authorized by Permit V-15-009 R2.

**PSD Applicability Analysis**

Due to the replacement of two PVC reactors, modification to the carrier dryer, and Boilers#1 and Boiler #2, and the resulting increase in the potential to emit (PTE) of the source, the following emission units were subject to a PSD applicability analysis.

| Emission Unit | Description |
|---|---|
| 03 | PVC storage silos |
| 06 | PVC railcar loading |
| 10 | Wastewater management system |
| 12 | Sources following the Resin Stripping Columns |
| 15 | Boiler #1 |
| 21 | Rotary Dryer #3 |
| 22 | Boiler #2 |
| 30 | Cooling tower |
| 33 | Carrier fluidized bed dryer |
| 78 | Andritz fluidized bed dryer |
| 79 | Andritz fluidized bed dryer |

To determine the significant increase of the source due to the proposed project, the permittee calculated the *baseline actual emissions* of the source during the 24 month period of January 2014, though December 2015, in tons per year of a regulated NSR pollutant to establish the current source emissions. The permittee then used *projected actual emissions,* instead of the actual PTE of the source, to determine future emissions after completion of the project. The source also took into consideration the emissions that *could have been accommodated*. This was determined by taking the month with the highest emissions during the two-year baseline period (December 2015), and multiplying the emissions by 12 to *annualizing* the emissions. The difference between December 2015 *annualized emissions* and the *baseline actual emissions* are the emissions that *could have been accommodated* if the source had operated continuously at the *annualized emissions* production rate. The *Adjusted increased emissions* are the difference from the *projected actual emissions* and the *baseline actual emission* excluding the *demand growth exclusion.*

| Pollutant | PSD Significant Net Emission Increase[1] | Baseline Actual Emission[2] | Projected Actual Emission[3] | Could Have Accommodated Emission[4] | Adjusted Increased Emissions[5] |
|---|---|---|---|---|---|
| PM | 25 | 55.77 | 74.79 | 12.77 | 6.24 |
| $PM_{10}$ | 15 | 36.66 | 47.21 | 7.77 | 2.78 |
| $PM_{2.5}$ | 10 | 36.66 | 47.21 | 7.77 | 2.78 |
| CO | 100 | 358.00 | 460.05 | 75.53 | 26.53 |
| $NO_X$ | 40 | 522.77 | 668.09 | 112.92 | 32.4 |
| $SO_2$ | 40 | 3.27 | 4.18 | 0.68 | 0.24 |
| VOC | 40 | 97.86 | 129.71 | 22.65 | 9.19 |

Notes:
1. *PSD significant net emission increase*. See 401 KAR 51:001, Section 1(218) for the definition of "significant" and 401 KAR 51:001, Section 1(144) for the definition of "Net emissions increase."
2. *"Baseline actual emissions"* are the emissions in tons per year of a regulated NSR pollutant of the source during the 24 month period of January 2014, though December 2015. See 401 KAR 51:001, Section 1(20).
3. *"Projected actual emission*" is based on the permittee's estimation that the facility will, on an annual basis, produce 1.7 billion pounds of PVC. See 401 KAR 51:001, Section 1(199)(b)1.
4. "*Could have been accommodated*" was determined by taking the month with the highest emissions during the two-year baseline period (December 2015), and multiplying the emissions by 12 to *annualizing* the emissions. The difference of the *annualized* emissions and the "*baseline actual emissions"* is the "*could have been accommodated"* emissions.
5. *Adjusted increased emissions* are the difference from the *projected actual emissions* and the *baseline actual emission* excluding the "*demand growth exclusion"* emissions.

**Minor Permit Revision – Permit V-15-009 R1**
**Activity APE20160002**
A minor revision application was received by the Division on February 12, 2016, to increase the annual polyvinyl chloride capacity of the source from 1,400 million pounds to 1,500 million pounds. The table below summarizes the construction and increased utilization authorized by the minor revision.

| Emission Point | Equipment | Description of Change |
|---|---|---|
| 03 | Silo Loading | Increased utilization |
| 06 | Railcar Loading | Increased utilization |
| 10 | Wastewater Management System | Increased utilization |
| 12 | Sources following the Resin Stripping Columns | Increased utilization |
| 15 | Boiler #1 | Increased utilization |
| 20 | Fugitives Piping Leaks | Adding components |
| 21 | Rotary Dryer #3 | Increased utilization |
| 22 | Boiler #2 | Increased utilization |
| 23 | Equipment Openings | New stripper column |
| 30 | Cooling Tower | Increased utilization |
| 33 | Carrier Fluidized Bed Dryer | Increased utilization |
| 78 | Fluidized Bed Dryer | Increased utilization |
| 79 | Fluidized Bed Dryer #2 | Increased utilization |

The project, that included the three sources, has provided emission calculations and specific documents to show that the increased emissions are not significant and do not trigger a Prevention of Significant Deteriorations (PSD) review. Minor additions, a stripping column and piping equipment components, where added to the permit as a result of this revision. The application was deemed complete on April 28, 2016.

**Permit Renewal – Permit V-15-009**
The Division received a permit renewal application (APE20110001) for Permit V-05-084 on May 13, 2011. The Westlake Polyvinyl chloride (PVC) Corporation (Westlake PVC) is a synthetic organic chemical manufacturing industry (SOCMI) source falling under SIC Group 28. Polyvinyl chloride is produced at this facility by polymerization of vinyl chloride monomer in batch reactors. Following polymerization, the polyvinyl chloride slurry is sent to steam stripping columns to separate the

polyvinyl chloride from unreacted vinyl chloride monomer which is recycled back into the process. The gas stream from the recovery system is vented to the process vent incinerator. Following the stripping process, the resin is sent to the slurry bend tanks and dryer feed tanks. Next, the polyvinyl chloride resin is dried, screened and sent to PVC storage silos. Polyvinyl chloride is produced at this facility and the finished product is shipped by truck and rail transport.

The source is major for the following pollutants:
Greenhouse Gas (measure as $CO_{2e}$); Carbon monoxide and volatile organic compounds (criteria pollutants); Vinyl chloride (individual hazardous air pollutants (HAP)); Hydrochloric acid, methanol, and vinyl chloride (total HAPs)

On December 23, 2014, the Division received a request for a compliance extension for certain requirements under 40 CFR 63, Subpart HHHHHHH. On March 27, 2015, the Division received from Westlake PVC additional information that had been requested by the Division to support the extension request. In this document Westlake PVC provided process and scheduling information on the modifications to the vent incinerator that would be required to bring the emissions levels of dioxin/furans into compliance with the regulatory limits. In a letter dated April 16, 2015, the Division granted to Westlake PVC an extension to April 17, 2016, to comply with the dioxin/furans emission limits of Subpart HHHHHHH.

Regulation 40 CFR 63, Subpart HHHHHHH, National Emission Standards for Hazardous Air Pollutant Emissions for Polyvinyl Chloride and Copolymers Production, is applicable to Westlake PVC and became effective on April 17, 2015. On April 21, 2015, Westlake PVC submitted DEP7007V forms to the Division specifying which regulations of Subpart HHHHHHH would be applicable to the source, and how Westlake PVC would meet these requirements.

**The renewal of Permit V-15-009 authorized the following Activities:**

**Activity APE20160001**
An Off-Permit Change request dated December 15, 2016 was received by the Division on December 22, 2015, to remove emission unit 01 (Rotary dryer #2) from the permit. An off-permit change was issued on April 15, 2016. The off-permit change was included in the final Permit V-15-009 issued on May 19, 2016.

**Activity APE20150003**
A minor revision permit application dated November 19, 2015, was received November 24, 2015, to install a 0.130 megaWatt emergency generator with a 189 horsepower natural gas fired spark ignition internal combustion engine. The minor revision was included in the final Permit V-15-009 issued on May 19, 2016.

**Activity APE20130001**
A minor revision permit application, dated May 15, 2013, was received May 20, 2013, to reactivate emission unit 21 (Rotary dryer #3). Emission unit 21 was in the original conditional major Permit F-94-017 and was included in Permit V-99-026 and V-05-084, until it was removed from the permit on October 8, 2009, with the issue of Permit V-05-084 R1. Below is a summary of the PSD analysis. It was determined that there was not a significant increase of emissions that would result in the applicability of 401 KAR 51:017.

| Pollutant | PSD Significant Net Emission Increase | Increased Emissions | Further Analysis Required? |
|---|---|---|---|
| PM | 25 | 6.30 | No |
| $PM_{10}$ | 15 | 0.49 | No |
| CO | 100 | 5.41 | No |
| $NO_X$ | 40 | 6.57 | No |
| $SO_2$ | 40 | 0.04 | No |
| VOC | 40 | 0.35 | No |
| $CO_2e$ | 75,000 | 7671 | No |

**Activity APE20120002**

A minor revision permit application, dated November 12, 2012, was received November 13, 2012, to increase the annual polyvinyl chloride capacity of the source from 1,150 million pounds to 1,400 million pounds. The table below summarizes the construction and modifications authorized by the minor revision.

| Equipment Status | Equipment/Modification Description | Emission Unit Impacted | |
|---|---|---|---|
| Removed | N/A | 07 | Fluidized bed dryer |
| | | 08 | Flash dryer |
| Modified | Recovery system | 20 | Fugitive equipment leaks |
| | Increased rail car loading | 06 | PVC railcar loading |
| New | Two reactors | 09 | Vent Incinerator |
| | | 12 | Sources following the Resin Stripping Columns |
| | | 23 | Equipment opening emissions |
| | Miscellaneous process components | 20 | Fugitive equipment leaks |
| | | 23 | Equipment opening emissions |
| | New dryer | 79 | Fluidized bed dryer |
| | New cell added | 30 | Cooling tower |
| | SML Dryer feed tank | N/A | Insignificant activity |

**PSD Applicability Analysis**

Due to the increased production capacity resulting from the addition of new PVC reactors, dryers, and cooling tower capacity, and the resulting increase in the and potential to emit (PTE) of the source, the following emission units were subject to a PSD applicability analysis.

| Emission Unit | Description |
|---|---|
| 03 | PVC storage silos |
| 06 | PVC railcar loading |
| 09 | Vent incinerator |
| 10 | Wastewater management system |
| 12 | Sources following the Resin Stripping Columns |
| 15 | Boiler #1 |
| 20 | Fugitive equipment leaks |

| Emission Unit | Description |
|---|---|
| 22 | Boiler #2 |
| 23 | Equipment opening emissions |
| 30 | Cooling tower |
| 33 | Carrier fluidized bed dryer |
| 78 | Andritz fluidized bed dryer |
| 79 | Andritz fluidized bed dryer |

To determine the significant increase of the source due to the proposed project, the permittee used the *baseline actual emissions* of the source, in tons per year of a regulated NSR pollutant, as defined in 401 KAR 51:001, Section 1(20)(b) to establish the current source emissions. The permittee then used *projected actual emissions*, as defined in 401 KAR 51:001, Section 1(199), instead of the actual PTE of the source, to determine future emissions after completion of the project. The source also took into consideration the emissions that *could have been accommodated*. This was determined by taking the month with the highest emissions during the two-year baseline period (March 2011) and multiplying the emissions by 12 to *annualizing* the emissions. The difference between March 2011 *annualized emissions* and the *baseline actual emissions* are the emissions that *could have been accommodated* if the source had operated continuously at the March 2011 production rate. The emission increase due to the project is the difference between the *projected actual emissions* and the March 2011 *annualized emissions*.

| Pollutant | PSD Significant Net Emission[1] Increase | Baseline Actual Emission[2] | March 2011 Annualized Emissions[3] | Projected Actual Emission[4] | Demand Growth Exclusion[5] | Adjusted Increased Emissions[6] |
|---|---|---|---|---|---|---|
| PM | 25 | 18.91 | 20.32 | 35.93 | 1.39 | 15.62 |
| $PM_{10/2.5}$ | 15 | 2.92 | 3.75 | 5.81 | 0.81 | 2.06 |
| CO | 100 | 27.52 | 36.92 | 51.10 | 7.40 | 16.19 |
| $NO_X$ | 40 | 20.53 | 25.94 | 35.39 | 5.41 | 9.45 |
| $SO_2$ | 40 | 0.23 | 0.29 | 0.41 | 0.07 | 0.12 |
| VOC | 40 | 17.29 | 22.04 | 31.9 | 4.75 | 9.86 |

Notes:

1. *PSD significant net emission increase*. See 401 KAR 51:001, Section 1(218) for the definition of "significant."
2. *"Baseline actual emissions"* are the average emissions from the 2010 and 2011 calendar year. See 401 KAR 51:001, Section 1(20).
3. *March 2011 annualized emissions* are based on the emissions during March of 2011 (peak monthly emissions for 2011), multiplied by twelve.
4. *"Projected actual emission."* See 401 KAR 51:001, Section 1(199). Also includes emissions from emission unit 21 (rotary dryer added by the minor revision application May 20, 2013.
5. *Demand growth exclusion* is the difference between the *March 2011 annualized emissions* and the *baseline actual emissions*. This is the portion of the unit's emissions following the project that an existing unit could have accommodated during the consecutive twenty-four (24) month period used to establish the *baseline actual emissions* and that are also unrelated to the project, including

any increased utilization due to product demand growth. See 401 KAR 51:001, Section 1(199)(b)1.c.

6. *Adjusted increased emissions* are the difference from the *projected actual emissions* and the *baseline actual emission* excluding the *demand growth exclusion* as specified in 401 KAR 51:001, Section 1(199)(b)1.c.

**Activity APE20120001**

A 502(b)(10) change request, dated April 12, 2012 was received by the Division on April 20, 2012, requesting permission to startup emission unit 21 (Rotary dryer #3) for the purpose of conducting a performance test. The request was granted August 17, 2012.

**APPLICABLE REGULATIONS:**

401 KAR 51:017, Prevention of significant deterioration of air quality, is applicable to a project at an existing major stationary source that commences construction after September 22, 1982 and is located in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii) and (iii). This regulation is applicable to:

1. Emission unit 15 (Boiler #1) and emission unit 22 (Boiler #2) for $NO_X$ emission and low $NO_X$ burners as a control device [BACT] requirements.
2. Westlake PVC is also subject to specific recordkeeping reporting requirements for PM pursuant to 401 KAR 51:017, Section 16(5)(a) for emission unit 03 (PVC storage silos), emission unit 06 (PVC railcar loading), emission unit 09 (Vent incinerator), emission unit 15 (Boiler #1), emission unit 22 (Boiler #2), emission unit 30 (Cooling tower), emission unit 33 (Fluidized bed dryer), pursuant to 401 KAR 51:017, Section16 (5)(a) for emission unit emission unit 78 (Andritz Fluidized bed dryer), and emission unit 79 (Andritz Fluidized bed dryer). Westlake PVC is also subject to specific recordkeeping reporting requirements for NOX for emission unit 15 (Boiler #1), emission unit 21 (rotary dryer #3, emission unit 22 (Boiler #2), and emission unit 33 (Carrier fluidized bed dryer).
3. Emission Unit 31 (31) Cooling tower #2 is subject to BACT for VOC and PM, $PM_{10}$ and $PM_{2.5}$ per permit V-15-009 R4.
4. Emission units 33 (Carrier fluidized bed dryer), 78 (Andritz Fluidized bed dryer) and 79 (Andritz Fluidized bed dryer) are subject to BACT for PM, $PM_{10}$ and $PM_{2.5}$ per permit V-15-009 R4.

401 KAR 59:010, New process operations, applies to each affected facility or source, associated with a process operation, which is not subject to another standard with respect to particulates in 401 KAR chapter 59, that commenced on or after July 2, 1975. This regulation applies to emission unit 03 (PVC storage silos), emission unit 14 (Half PVC storage silo), emission unit 21 (Rotary dryer #3), emission unit 33 (Fluidized bed dryer), emission unit 78 (Fluidized bed dryer), and emission unit 79 (Fluidized bed dryer), emission unit 30 (cooling tower), and emission unit 31 (cooling tower #2).

401 KAR 59:015, New indirect heat exchangers, is applicable for particulate, opacity and $SO_2$ emissions from indirect heat exchangers having a heat input capacity greater than one (1) million Btu per hour (MMBtu/hr) and less than 250 MMBtu/hr and commenced on or after April 9, 1972. This regulation applies to emission unit 15 (Boiler #1) and emission unit 22 (Boiler #2).

401 KAR 63:010, Fugitive emissions, applies to an apparatus or operation which emits or may emit fugitive emissions provided that the fugitive emissions from the facility are not elsewhere subject to an opacity standard within the administrative regulations of the Division. This regulation applies to emission unit 06 (Railcar loading).

401 KAR 60:005, Section 2(2)(d), 40 C.F.R. 60.40c to 60.48c (Subpart Dc), Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. This regulation applies to emission unit 15 (Boiler #1) and emission unit 22 (Boiler #2) for record keeping for each steam generating unit that burns natural gas with a heat input capacity less than 100 MMBtu/hr but greater than 10 MMBtu/hr, that commenced after June 9, 1989.

401 KAR 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 to 60.4248, Tables 1 to 4 (Subpart JJJJ), Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. This regulation applies to emission unit 080 (Emergency generator).

401 KAR 63:002, Section 2(4)(kk), 40 C.F.R. 63.1019 to 63.1039, Table 1 (Subpart UU), National Emission Standards for Equipment Leaks - Control Level 2 Standards. This regulation applies to emission unit 20 (Fugitive equipment leaks).

401 KAR 63:002, Section 2(4)(eeee), 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. This regulation applies to emission unit 080 (Emergency generator).

401 KAR 63:002, Section 2(4)(iiii), 63.7480 to 63.7575, Tables 1 to 13 (Subpart DDDDD), National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters is applicable industrial, commercial, or institutional boiler or process heater as defined in 40 CFR 63.7575 that is located at, or is part of, a major source of HAP, except as specified in 40 CFR 63.7491. This regulation applies to emission unit 15 (Boiler #1) and emission unit 22 (Boiler #2).

401 KAR 63:002, Section 2(4)(dddddd), 40 C.F.R. 63.11860 to 63.12005, Tables 1 to 10 (Subpart HHHHHHH), National Emission Standards for Hazardous Air Pollutant Emissions for Polyvinyl Chloride and Copolymers Production, is applicable to polyvinyl chloride and copolymers production process units as defined in 40 CFR 63.12005 that are located at, or are part of, a major source of hazardous air pollutants emissions. This regulation applies to emission unit 09 (Vent incinerator), emission unit 10 (Wastewater management system), emission unit 12 (Sources following the resin stripping columns), emission unit 20 (Fugitive equipment leaks), emission unit 23 (Equipment opening emissions), emission unit 30 (Cooling tower) and emission unit 31 (Cooling tower #2).

40 CFR 64, Compliance Assurance Monitoring, applies to each pollutant specific emissions unit at a major part 70 source when the emission unit has a pre-controlled potential to emit of a regulated air pollutant at or greater than 100 percent of the applicable part 70 major source threshold. The detailed compliance assurance monitoring (CAM) requirements are included in Section B of the permit. This regulation applies to emission unit 03 (PVC storage silos), emission unit 14 (Half storage silo), emission unit 33 (Fluidized bed dryer), emission unit 78 (Fluidized bed dryer), and emission unit 79 (Fluidized bed dryer) for particulate emissions.

**STATE ORIGIN REQUIREMENTS:**

401 KAR 63:020, Potential hazardous matter or toxic substances, is applicable to emission unit 09 (Vent incinerator) because of the chlorine ($Cl_2$) that is generated during to the thermal destruction of the vinyl chloride. The following is the results of the air modeling showing the maximum level of exposure due to $Cl_2$ emissions:

| Pollutant | Maximum Concentration | Distance to Maximum | Carcinogenic Target Risk | Noncancer Hazard Index |
|---|---|---|---|---|
| $Cl_2$ | 0.01814 µg/$m^3$ | 236 meters | None Listed | 0.15 µg/$m^3$ |

**NON-APPLICABLE REGULATIONS:**

401 KAR 63:020, Potential hazardous matter or toxic substances, is applicable to a facility that emits or may potentially emit hazardous or toxic substances provided such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division. Emission unit 09 (Vent incinerator), emission unit 10 (Wastewater management system), emission unit 12 (Sources following the resin stripping columns), emission unit 20 (Fugitive equipment leaks), and emission unit 23 (Equipment opening emissions) are subject to 40 CFR 63, Subpart HHHHHHH, therefore, 401 KAR 63:020 is not applicable with respect to vinyl chloride or hydrochloric acid (HCl).

401 KAR 61:175, Leaks from existing synthetic organic chemical and polymer manufacturing equipment, applies to each affected facility commenced on or before January 5, 1981, which is located in a county or portion of a county which is designated ozone nonattainment, for any nonattainment classification except marginal, under 401 KAR 51:010. This regulation is not applicable because the source commenced prior to January 5, 1981 and is located in a county that is not a nonattainment county.

401 KAR 57:002, 40 C.F.R. Part 61 national emission standards for hazardous air pollutants, incorporating by reference 40 CFR 61, Subpart F, National Emission Standard for Vinyl Chloride. Pursuant to 40 CFR 63, Subpart HHHHHHH as specified in 40 CFR 63.11875(a), after the Subpart HHHHHHH compliance date of April 17, 2015, an affected source that is also subject to the provisions of Subpart F to part 61, is no longer subject to subpart F to part 61. As a result, Westlake will no longer be required to comply with any and all permit conditions referencing 40 CFR 61.60-61.71.

**PRECLUDED REGULATIONS for Cooling Towers:**

401 KAR 63:002, 40 C.F.R. Part 63 national emission standards for hazardous air pollutants, incorporating by reference 40 CFR 63, Subpart Q, National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers. This regulation is precluded as long as the cooling towers are not operated with chromium-based water treatment chemicals.

**PRECLUDED REGULATIONS:**

401 KAR 51:017, Prevention of significant deterioration of air quality, is applicable to a project at an existing major stationary source that commences construction after September 22, 1982 and is located in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii) and (iii). The source has elected to accept synthetic minor limits in order to preclude the applicability of 401 KAR 51:017 for emission unit 03 (PVC storage silos), emission unit 15 (Boiler #1), emission unit 21 (Rotary dryer #3), emission unit 22 (Boiler #2), and emission unit 33 (Fluidized bed dryer). The following is a summary of the synthetic minor limits to preclude the applicability of 401 KAR 51:017.

**EMISSION AND OPERATING CAPS DESCRIPTION:**

a. Emission unit 15 (Boiler #1) and emission unit 22 (Boiler #2)
   (1) In Permit F-94-017, a natural gas limit of 76,530 cubic feet/hour ($ft^3$/hr) was established. This was revised to 100,576 $ft^3$/hr in Permit F-94-017 R1. The Statement of Basis for the initial Title V Permit V-99-026 stated that this synthetic minor limit for fuel usage would be carried forward. However, the natural gas limit was not referenced as a synthetic minor limit. In

Permit V-05-084, this was corrected and the natural gas fuel usage limit was again referenced as a synthetic minor limit. In Permit V-15-009, a 100,576 $ft^3$/hr synthetic minor limit on natural gas fuel usage pursuant to Permit F-94-017, revised in Permit F-94-017 R1, Permit V-99-026, and Permit V-05-084 will be referenced.

(2) In Permit V-99-026 R1, ethylene fuel oil was added as a fuel which required a prevention of significant deterioration **(**PSD) review. The PSD review determined that only nitrogen oxides ($NO_X$) had a significant increase in emissions. Based on the best available control technology (BACT) analysis, an annual limit of 60.13 tons $NO_X$ emissions for both boilers combined was added to the permit. In addition, during the BACT analysis, the EPA's RACT/BACT/LAER Information System was searched to determine commonly used technology for controlling $NO_X$ formation. The BACT determination was that the permittee must maintain low $NO_X$ burners on any boiler burning ethylene fuel oil. In Permit V-05-084, the BACT limit was modified to require low $NO_X$ burners on both boilers. In Permit V-15-009, a $NO_X$ 60.13 ton/year BACT limit for both boilers combined, pursuant to Permit V-99-026 R1 will be referenced. In addition, the BACT requirement of low $NO_X$ burners on both boilers pursuant to V-99-026 R1 and revised in Permit V-05-084 will be referenced.

(3) In the renewal application, only natural gas was listed as a fuel. Therefore, all the synthetic minor limits with respect to fuels other than natural gas have been removed from Permit V-15-009. The source will not be permitted to burn liquid or solid fuels, or gaseous fuels meeting the definition of "other gas 1 fuel" in 40 CFR 63.7575 unless a permit revision is submitted.

(4) The permittee has conducted performance tests on emission unit 15 and emission unit 22 to determine the $NO_X$ emissions. The capacity of the boilers during the performance tests was approximately two-thirds of maximum capacity. Therefore, pursuant to 401 KAR 50:045, Section 5(2), permittee can only operate the boilers at or below 110 percent of the heat loads during the tests. Prior to operating at a heat load above 110 percent of the heat load during the previous test, the emission units must be retested and the new emissions factors obtained from the tests must be used to verify compliance with $NO_X$ emission limitations.

b. Emission unit 09 (Vent incinerator)

Emission unit 09 is the control device burns waste from Westlake PVC and Wacker Chemical Corporation as of permit V-15-009 R3. The maximum capacity of the waste sent to the vent incinerator will be as follows:

(1) The maximum waste gas sent to the vent incinerator will be 110 percent of the waste gas destroyed during the most recent performance test.

(2) A performance test for volatile organic compounds (VOC) is required pursuant to 40 CFR 63, Subpart HHHHHHH with the results given in parts per million volume (ppmv). This is the first performance conducted on emission unit 09, pursuant to 401 KAR 50:045, since the incinerator was installed in 2009. Within sixty days after completion of the performance test, using emissions data determined from the performance test, the permittee must submit a DEP7007N form for emission unit 09, with a VOC emission factor in pounds of VOC emissions per source classification code (SCC) unit, and the method used to calculate the emission factor. The process rate, also in SCC units, and any other applicable data must also be provided. The emissions from natural gas combustion in the incinerator burners shall be listed separately from the emissions generated by the destruction of the waste gas.

c. Emission unit 12 (Sources following the resin stripping columns)

(1) The table below shows the history of the polyvinyl chloride production capacity and the vinyl chloride emission limits.

| Permit Number | Production Capacity | Vinyl Chloride Concentration/Emissions | | |
|---|---|---|---|---|
| | *Tons/yr* | *ppm*[1] | *lb/hr* | *ton/yr* |
| F-94-017 | 300,000 | None | 13.7 | 60 |
| F-96-023[2] | 750,000 | 40 | 98 | 30 |
| F-96-023 R1[3] | 400,000<br>750,000 | 105<br>40 | 98 | 41.5<br>30 |
| V-99-026 R1 | 450,000[4]<br>750,000 | 90<br>40 | 98 | 41.5<br>30 |
| V-05-084 | 450,000[5] | 90 | 57.2 | 40.5 |
| V-05-084 R1 | | | 66.7 | 40.5 |
| V-15-009 | 700,000 | | 66.7 | 40.5 |
| V-15-009 R1 | 750,000 | | 66.7 | 40.5 |

Notes:

1. Pursuant to 40 CFR 61, Subpart F, the weighted average residue vinyl chloride concentration in all grades of polyvinyl chloride resin processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed 400 parts per million (ppm). The weighted vinyl chloride concentration listed in the table is the 12-month average synthetic minor limit. Beginning with Permit V-05-084 R1 the limit was eliminated.
2. Listed as an emission limitation for emission unit 33 (dryers 33, 34, 35, and 36).
3. Permit V-96-023 R1 authorized a production capacity increase: The capacity prior to the increase is 400,000 tons per year (tpy) and the capacity of after the increase would be 750,000 tpy.
4. The production increase authorized by Permit F-96-023 R1 was increased to 450,000.
5. The expansion and production increase authorized by Permit F-96-023 R1 was cancelled and removed from the permit.

(2) To preclude applicability of 401 KAR 51:017, the source will be limited to 850,000 tons per year polyvinyl chloride production [401 KAR 52:020, Section 26.]

(3) In Permit V-15-009, a 40.5 tons/year vinyl chloride synthetic minor limit (volatile organic compounds (VOC) emissions) pursuant to Permit F-94-017, revised in Permits F-96-023, F-96-023 R1, and V-05-084 will be referenced. A 66.7 lb/hr vinyl chloride synthetic minor limit pursuant to Permit F-94-017, revised in Permit F-96-023, Permits V-05-084 and V-05-084 R1 will be referenced.

d. Emission unit 21 (Rotary dryer #3)
PM emissions were initially limited to 5.17 lb/hr, in F-94-017. The limit was revised to 6.02 lb/hr in Permit F-94-017 R1 and was changed to 5.7 lb/hr in F-94-017 R2. In Permit V-15-009, a 5.7 lb/hr PM synthetic minor from Permit F-94-017, revised Permit F-94-017 R1, and Permit F-94-017 R2 will be referenced.

e. Emission unit 33 (Fluidized bed dryer)
A synthetic minor limit of 2.00 lb/hr was established for emission unit 33 in Permit F-96-023. In Permit V-15-009, the 2.00 lb/hr PM synthetic minor limit from Permit F-96-023 will be referenced.

f. Emission unit 33, 78, and 79 (Fluidized bed dryers)
PM emissions from these emission units shall not exceed the limits pursuant to 401 KAR 59:010, Section 3(2).

g. Applicability of 401 KAR 59:010
Emission unit 21, emission unit 33, emission unit 78, and emission unit 79 are subject to 401 KAR 59:010 "New process operations." Emission unit 21 was originally subject to 401 KAR 61:020 "Existing process operations," but was reconstructed pursuant to Permit F-94-017, making the source now also subject to 401 KAR 59:010.

h. Emission unit 03 (PVC storage silos)
For each PVC storage silo, in Permit V-15-009, a PM synthetic minor limit of 0.15 lb/hr and 0.5 ton/year from Permit F-94-017 and revised in Permit F-94-017 and Permit F-96-023 will be referenced.

i. Emission unit 08 (Emergency generator)
Emission standards for $NO_X$, CO, and VOC pursuant to 40 CFR 60.4233(e).

j. As part of the significant revision permit (V-15-009 R4), Westlake has chosen to impose maximum hourly and annual heat ratings for the following units: Emission unit 15 (Boiler #1); Emission unit 22 (Boiler #2); Emission unit 021 (Rotary dryer #3 with integral cyclone) and Emission unit 33 (Carrier Fluidized bed dryer with integral cyclone).

**PERIODIC MONITORING:**

a. Emission unit 09 (Vent incinerator)
For control of HCl and $Cl_2$ emissions, the permittee shall install, calibrate, maintain and operate the following monitoring equipment on the wet scrubber:
(1) A flow meter to monitor the absorber or acid gas scrubber influent liquid flow;
(2) Pressure gauges at the inlet and outlet of the acid gas scrubber to monitor the pressure drop through the acid gas scrubber; and
(3) A conductivity monitoring device to monitor the conductivity of the scrubber liquid effluent.

b. Emission Unit 10 (Wastewater management system)
The permittee must conduct the following monitoring of the wastewater stream:
(1) Make monthly measurements of the vinyl chloride and total non-vinyl chloride organic HAP concentrations for each process wastewater stream must be treated to reduce the concentration of vinyl chloride or total non-vinyl chloride organic HAP; or
(2) Conduct annual performance tests, measuring the vinyl chloride and total non-vinyl chloride organic HAP concentrations for each wastewater stream for which treatment is not required to reduce the vinyl chloride or total non-vinyl chloride organic HAP concentration.

c. Emission unit 12 (Sources following the resin stripping columns)
(1) On a daily basis, permittee must measure the concentration of vinyl chloride in stripped resin using specified test methods;
(2) On a monthly basis, permittee must measure the concentration of total non-vinyl chloride organic HAP in stripped resin using specified test methods; and
(3) Permittee must demonstrate continuous compliance with the vinyl chloride and total non-vinyl chloride organic HAP emission limit for stripped resin in Table 1 using specified test methods.

d. Emission units 20 (Fugitive equipment leaks)
A reliable and accurate vinyl chloride monitoring system shall be operated for detection of major leaks and identification of the general area of the plant where a leak is located.

e. Emission units 33, 78, and 079 (Fluidized bed dryers)
(1) Each venturi scrubber shall be monitored continuously (a 3-hour rolling average with at least three (1) data values per hour) for:
(i) The pressure loss of the gas stream through the scrubber; and
(ii) The scrubbing liquid flow rate to the scrubber.
(2) On a daily basis, and during all periods of venturi scrubber malfunction, if the corresponding dryer is in operation, the permittee shall conduct a qualitative visible emissions evaluation of the dryer stack.

f. Emission unit 03 (PVC storage silos)
(1) Each baghouse shall be monitored continuously for pressure loss of the air stream through each PVC storage silo baghouse.
(2) On a daily basis, and during all periods of baghouse malfunction, if the corresponding PVC storage silo is in operation, the permittee shall conduct a qualitative visible emissions evaluation of the PVC storage silo stack.

g. Emission unit 080 (Emergency generator)
Monitor the hours of operation.

h. Emission unit 30 and 31 (cooling towers)
(1) The permittee shall perform a qualitative visual observation of the opacity of emissions at the cooling tower during operation of the associated unit on a weekly basis and maintain a log of the observations.
(2) The permittee shall monitor the total dissolved solids concentration or conductivity in cooling water of each cooling tower on a weekly basis.
(3) The permittee shall monitor the recirculation rate (in gallons per hour) cooling water for each cooling tower on a weekly basis.